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ORIGINAL CONTRIBUTION

Prevalence of major depression in preschool children

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Abstract The prevalence of preschool major depressive disorder (MDD) was studied in the community. The whole population of children between 3 and 6 years attending preschool nurseries in three areas (one urban, one rural and one suburban) in Spain ($n = 1{,}427$) were contacted. Selection was by a two-stage procedure. At stage I, the ESDM 3-6, a screening measure for preschool depression, was used to identify a sample for more intensive interviewing. Sensitivity and specificity of the cut-off point of the ESDM 3-6 had been previously tested in a pilot study ($n = 229$). During the first stage, 222 preschool children (15.6%) were found to be probable depressives, because they scored 27 or more, the cut-off used. At stage II, the children were interviewed and diagnosed by the consensus of two clinicians, blind to the ESDM 3-6 results. DSM-IV diagnostic criteria were used to define caseness. A total of 16 children (1.12%) met the MDD criteria. The prevalence by areas was urban 0.87%, rural 0.88%, suburban 1.43%. Sex distribution prevalence was 1:1. This study is a contribution to the scarce epidemiology of preschool depression in the community.

Keywords Preschoolers · Child depression · Epidemiology · ECI · ESDM 3-6

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Introduction

This study provides prevalence data on preschool major depression in the general population in Spain. Until recently, the diagnosis of depression in preschoolers has been controversial. Some developmental theorists rejected the possibility that children who were too immature cognitively and affectively to experience internalizing symptoms of depression could be clinically depressed. Nevertheless, information about clinical depression in preschoolers started to appear in the literature about two decades ago [5, 21–26]. Previously, Poznanski and Zrull [37] used their own criteria for diagnosing depression to review the records of 1,788 children in a child psychiatry setting. They reported three children under 6 years of age to be depressed. Currently, empirical studies have demonstrated that negative behaviors and emotions consistent with a depressive syndrome can be observed in children as young as 3 years of age [35]. Luby et al. [32] proved that preschool major depressive disorder (MDD) can be diagnosed with DSM-IV criteria and that preschoolers can manifest a clinical depressive syndrome [33, 34].

At such ages, depression usually goes unnoticed because preschool children do not express the emotional suffering of depressive conditions in words and because development modifies the expression of emotional disturbance at each stage of the child's growth. Parents, teachers and sometimes clinicians do not consider the possibility that preschoolers are depressed; hence, most of these patients are neither detected nor examined. Because of this situation, then, Kashani et al. [23] considered that preschool-age depression ought to be studied in the general population and not just in the population already undergoing clinical treatment.

Very few epidemiological studies of depression have focused on children under the age of 6 and most of the ones that have were conducted in clinical populations. Because this field is relatively a new one, prevalence is uncertain but is likely to be approximately 1% [41]. The present study provides prevalence data on preschool depressive symptoms and major depression in the general population in Spain.

Our goals were (1) to apply a new screening measure: The "Escala de depresión preescolar para maestros (ESDM 3-6)" to a large sample of preschoolers, after determining the best cut-off point for the Spanish population of preschoolers; (2) to determine the prevalence of major depression in the general population of 3–6 years in Catalonia (Spain); (3) to compare the results between boys and girls and between rural and urban areas.

Methods

Design

The prevalence of preschool depression was evaluated in three populations of preschool children in Catalonia (Spain): one urban, one rural and one suburban.

A two-stage sampling procedure was used to identify cases and classify subjects into three groups: (1) non-depressed preschoolers; (2) preschoolers with depression symptomatology; (3) preschoolers with major depression.

During the first stage, the ESDM 3-6 [4] was used as a screening instrument. A child was considered to be a probable case if he or she scored at or above the cut-off point of 27 on the ESDM 3-6. The sensibility and specificity of the cut-off point of the ESDM 3-6 have previously been tested in a pilot study.

During the second stage, each child was clinically evaluated using Luby et al.'s modification of DSM-IV diagnostic operational criteria [32]. Information was gathered by interviewing children themselves and completed by additional data from teachers and parents.

Participants

The whole population of children attending preschool public and private nurseries in three different areas was selected for the study. All these children were registered with the local education authority. In Spain, education is compulsory for children of 3 years. Preschool education is organized considering the year of birth of children. It comprises three levels: P3 (aged 3–4), P4 (aged 4–5) and P5 (aged 5–6). Mainstreaming is the rule, so the school population is practically the whole population in this age group and includes very poor and children with special needs. Furthermore, at preschool age, there are no drop outs and children with poor attendance were evaluated (Table 1).

The urban area was Olot, a small city of 27,000 inhabitants in the province of Girona in the North East of Spain. It

Table 1 The first stage sample (1,427 children): distribution by sex and school level stratified by area (urban, rural or suburban)

	P3 (3–4 years age)	P4 (4–5 years age)	P5 (5–6 years age)	All
Urban (20)				
Males				
n	70	78	88	236
%	29.7	33.1	37.3	100
Females				
n	79	71	74	224
%	35.3	31.7	33.0	100
Rural (29)				
Males				
n	55	68	59	182
%	30.2	37.4	32.4	100
Females				
n	43	59	55	157
%	27.4	37.6	35.0	100
Suburban (35)				
Males				
n	92	105	125	322
%	28.6	32.6	38.8	100
Females				
n	124	91	91	306
%	40.5	29.7	29.7	100
Total				
Males				
n	217	251	272	740
%	29.3	33.9	36.8	100
Females				
n	246	221	220	687
%	35.8	32.2	32.0	100

The number of classes by area is given in brackets

is in the middle of a fertile agricultural area (La Garrotxa). At the time of the study, Olot had five state schools and three private schools, but only three public and the three private accepted. All the private schools, but only three of the state schools agreed to participate. In these six schools, there were 20 preschool classes and 580 children. However, only 460 were given parental permission. Therefore, 460 children were assessed of which 236 boys and 224 girls.

The rural area consisted of the villages from the two Catalan regions of Priorat and Ribera d'Ebre. Rural was defined according to the number of inhabitants and the percentage of people working in the primary sector (peasants and fishermen). All the villages of Priorat with fewer than 2,600 inhabitants took part in the study. This meant a total of 16 schools with one teacher in each. There were 14 schools of this kind in Ribera d'Ebre and all but one participated. In this rural sample, the total number of children assessed was 339: 182 boys and 157 girls.

The suburban area was Montcada (27,068 inhabitants at the time of study), in the outskirts of Barcelona. In Montcada, there were eight schools: six state and two private, with a total of 35 classes. A total of 628 children were assessed: 322 boys and 306 girls. The 35 teachers of the eight schools completed the ESDM 3-6 for all the children in their classes.

In the first stage, then, the total eligible sample was 1,870 boys and girls aged 3–6 years old. Of these, 696 (37.2%) lived in Montcada, 746 (39.9%) in Olot and 428 (22.9%) in the rural area. The number of non-participants was 443 (23.69%). Therefore, the number of the sample was 1,427 (76.31%).

Instruments

The ESDM 3-6

The ESDM 3-6 (see Appendix) is a tool that was created by Domènech-Llaberia in 1996 to detect symptoms of preschool child depression from information provided by teachers [4]. It was designed to be used with populations of school attenders in a context of community health or epidemiological studies. It consists of 19 questions with multiple-choice answers about various aspects of depressive psychopathology that normally show up in a school environment. The main purpose of creating the ESDM 3-6 was to provide early detection of depressive symptoms so that they could, if necessary be treated and chronic depressive illness prevented. It is answered by a teacher who knows well the child and has been observing him/her the previous days.

Many of the questions refer to dysphoria. For example, item 1: "she/he has a sad expression"; 5: "she/he laughs or smiles"; 17: "she/he seems in a bad mood". Other items refer to somatic responses, level of activity, and so on. The questions try to cover the emotional changes that are most easily detectable by the teachers, who can choose between three possible answers: "almost never", "sometimes" and "almost always", depending on how often the behavior in question occurs in their opinion.

The validation was carried out on a random stratified sample of 436 preschool children of both sexes attending preschool education in San Cugat del Vallès, a small town near Barcelona. The reliability of the ESDM 3-6 as a whole in terms of its internal consistency was tested with Cronbach's alpha coefficient, and its concurrent validity was tested with GRASP-M [23]. The internal structure was studied using PRINCALS. The Cronbach's alpha coefficient for the ESDM 3-6 as a whole was 0.81. Pearson's correlation coefficient between ESDM 3-6 and GRASP-M was 0.84 ($P \leq 0.0005$) [1]. A three-dimensional PRINCALS saturation was chosen, which accounted for 45% of the variance [7]. ESDM 3-6 should be considered as a screening instrument for epidemiological studies of depression.

The Early Childhood Inventory-4: The ECI-4

A Spanish version of the ECI-4 was used to obtain information from parents and teachers and complete the data from the child's interview [15, 16, 39, 40]. It was a DSM-IV-Referenced Screening Instrument for Preschool. It has two versions: a 108-item version for parents and a 77-item version for teachers. Scoring procedures are both categorical and dimensional. Each item has four possible answers (never, sometimes, often, very often), depending on how often symptoms of the disorder occurred in the previous 6 months. Symptoms are divided into 13 categories. According to the authors [17, 40], the categories have adequate internal consistency and stability, and the instrument's criterion validity is suitable for the most common disorders of 3–6 years attending child psychiatric units. The depression category consists of 12 items and, with conduct disorder, has the highest parent–teacher agreement [40].

The psychometric properties of the ECI-IV have been studied in a Spanish sample of 412 preschoolers. The internal consistency was $\alpha = 0.67$ for the parent version and $\alpha = 0.93$ for the teacher version [20].

Sociodemographic questionnaire

A questionnaire to be completed by the parents was devised specifically for this study, in order to obtain information about family structure, number of brothers and sisters, age of parents, birth order, health problems, etc.

The families were divided into three types: (a) parents in a stable relationship with no children from previous relationships; (b) parents in a stable relationship living with grandparents or children from previous relationships; (c) others.

The Hollingshead Four-Factor Index [19] was included in this questionnaire. It is a weighted summary score that reflects the educational level and the occupational status of parents, and classifies family social status in different groups. To analyze our data, the groups were subdivided into three: low, medium and high.

Procedure

The first step was to calculate the best cut-off point of the "scale of depressive symptomatology for teachers 3-6 (ESDM 3-6)" for our population, in a pilot study. Hence, the ESDM 3-6 was presented to the teachers of preschoolers attending nine school classes in Barcelona. This sample consisted of 229 preschoolers of both sexes (121 boys and 108 girls). Following this administration, two clinicians, uninformed of the ESDM results, interviewed each child from the sample. Then, the two clinicians diagnosed the 229 preschoolers using the DSM-IV diagnostic operational criteria (except the criterion of duration) and classified them into three groups: normal, with MDD or with other psychologic disorders. The sensitivity, specificity, positive- and negative-predictive values, the percentage of cases correctly classified and the percentage of cases incorrectly classified, were calculated for the cut-off points between 23 and 31. The aim was to select the cut-off point that minimized the number of incorrectly classified cases and had the maximal predictive power. The ROC curve determined that 27 was the best cut-off point for the epidemiological study of preschool depression in our population, because it struck a balance between sensitivity and optimal specificity. The sensitivity for a score of 27 was 77% and the specificity 90%. The positive-predictive value for this cut-off was 0.46 and the negative-predictive value 0.97 [6].

After obtaining permission from the Catalan Government of Education for the research, we approached the managing bodies of schools and explained the project to them. Parents were requested to attend a meeting in the school where at which they were informed of the purpose of the study and they gave their written informed consent obtained. They were subsequently sent questionnaires by post which they had to return to the nurseries in a closed envelope. Parents whose questionnaires had missing data or obvious errors were contacted for clarification. Teachers were given questionnaires in every school.

Clinical interview

At the beginning of the study, we did not have a reliable validated structured interview for assessing a depressive disorder in a Spanish preschool population. Given this methodological problem, in the second stage, every child was evaluated by two clinicians, a child psychiatrist and a child psychologist in an open face-to-face interview in the school setting. They were blind to the results of the ESDM 3-6 and interviewed the child together. The behavior, emotions and language of the child were observed. The interview focused on aspects such as mood, face expression, behavioral inhibition, child–interviewer interaction, child–peer relations, physical complaints, content of thoughts, activity level, amount of play behavior exhibited and so on.

Definition of caseness

Caseness was defined based on the face-to-face open interview and the answers parents and teachers gave to the items of the MDD category of the ECI-IV.

When the diagnosis of the clinicians was contradictory, the child was not considered a case of DDM.

Preschoolers tend to underreport personal problems [22, 26]. Hence, the information obtained from the preschool children in the school context is essential, but insufficient to diagnose MDD. The children's answers to the 12 items on the depression scale of the ECI-4 enable the interviewers to complete the symptoms of the DSM-IV category not detected in the interview: for example, such young children are not aware of changes in their weight or their sleeping problems

Therefore, children were considered to be cases when they met the DSM-IV criteria, excluding duration, according to information gathered from a clinical open interview and from answers of parents and teachers to the items of DDM category of the ECI-4. The DSM-IV criteria used were those that had been developmentally modified by Luby et al. [32].

Results

Prevalence of children scoring 27 or more in the ESDM 3-6

The first prevalence estimates reported were based on the information provided by the teachers' responses to the ESDM 3-6 questionnaires. In total, there were 1,427. During this first stage, 15% (95% CI 13.7–17.6) of the children ($n = 222$) scored 27 or more in the ESDM 3-6, suggesting that they may be at a risk of depressive

disorders. The geographic distribution was 15.7% (95% CI 12.52–19.37) in the urban area of Olot, 12.1% (95% CI 8.91–16.16%) in the rural area and 17.4% (95% CI 14.52–20.60) in the suburban area. These differences are not statistically significant, but the difference between the suburban area and the other two approached significance. Moreover, in the rural area, the score is lower than in both the other two [χ^2 (2, n = 1,427) = 4.06, P = 0.044].

Sex distribution

Prevalence in the total sample was about the same in boys and girls: 118 boys (53.2%) and 104 girls (46.8%) scored 27 or more. The mean of ESDM in the population was 23.37 (SD = 3.99) for boys and 23.22 for girls (SD = 3.94) [t(1,425) = 0.697, n.s.). The mean in boys and girls with depressive symptomatology is also similar (30.86 for boys and 30.67 for girls) [t(220) = 0.397, n.s.].

The sex distribution in the three areas was the following: 47.2% of boys in the urban area scored 27 or more (n = 34), 53.7% in the rural area (n = 22) and 56.9% in the suburban area (n = 62).

Prevalence of preschool categorical depression

The total number of children diagnosed as having MDD was 16: 8 boys and 8 girls. In the suburban area, there were nine cases, five of which were boys; in the urban area (Olot) there were four cases, two boys and two girls; and in the rural area of there were three cases, two of which were girls. Hence, the prevalence of preschool depression, which is based on the definition of caseness obtained after the second phase, is 1.12% (95% CI 0.66–1.86).

Of the 16 cases, 3 are from the rural area (prevalence 0.88%; 95% CI 0.66–1.86%), 9 from the suburban area (1.43%; 95% CI 0.70–2.80%) and 4 from the urban area (0.87%; 95% CI 0.27–2.34%).

According to Hollingshead's results, 36.65% come from low, 56.6% from medium and 6.7% from high social class.

As far as family structure is concerned, 78% of the cases live with both parents, 14.2% with parents and grandparents and 7.2% only with their mother.

Discussion

Prevalence of preschool depression

To our knowledge, the first study reporting depression in a general population of preschoolers was conducted by Kashani et al. [23] who found a single child with MDD among 109. Essau and Petermann [13] also indicated a prevalence of <1% in preschool children. Few studies have been made of the prevalence of preschool depression in the community using DSM-III criteria. Recently, Egger and Angold identified four of them [12], only one of which, the Preschool Age Psychiatric Assessment (PAPA) test–retest study (PTRTS), used a structured interview for the diagnosis. They found a prevalence of 1.4% for major depression in a sample of 307 preschoolers. The prevalence found in the other three studies was 0% [9, 10] in a population of 100 children, 0.3% [28, 29] in a sample of 510 and 1.1% [27] in a population of 104 preschoolers.

In the present study, with a larger sample we have identified 16 cases in a population of 1,427. This is a prevalence of 1.2%, similar to that reported by Kashani [23], Keenan et al. [27] and the PTRTS. The prevalence of MDD was also similar in girls and boys. The lack of association between sex and depression before puberty has been found in many countries and in many epidemiological studies [2, 14, 36, 42].

In Spain, the estimated prevalence of MDD in preschoolers is lower than in older ages, as in other countries [23, 25, 26]. The rate found in Spain, with a sample of 9-year-old children in the community, was 1.8% [36]. In a review of epidemiological studies in 1995, Goodyer stated that major depression in the community was found in 2–5% of school-age children [18]. The prevalence is higher in adolescence. Rutter [38] observed that reported rates of both depressive symptoms and clinical depressive disorders were substantially greater in adolescents than in children. The adolescent prevalence of MDD in Barcelona at 13–15 years of age was 4.2% [8].

Few urban–rural differences have been found in preschoolers. The major difference is between the suburban area and the other two areas. We should point out that Olot is a small town in the middle of the countryside and the prevalence of depression in Madrid or Barcelona is probably a little higher. We also think that globalization has helped to diminish differences between villages and cities.

Informants

The present study has used three data sources, such as children themselves, teachers and parents. Children are known to be the main reporters of internalizing disorders and the best informants of depression. After children themselves, teachers are an important source of data for studying depression and depressive symptoms in preschool-age children [23]. Parents and teachers see different aspects of the child and information from both sources are complementary rather than contradictory.

The ESDM 3-6 is a screening tool for teachers to evaluate preschool depressive symptoms in the general population. There is a need for tools like this one to identify children with high levels of depressive symptoms

and at high risk of depressive disorders. The only well-validated measure of this kind we have found, when we were already using the ESDM 3-6, is the PFC or "Preschool Feelings Checklist" [31]. The difference between them is that the informants for the PFC are the parents while for the ESDM 3-6 the informants are the teachers. The Cronbach's alpha we found (0.81) is as good as the one found by Luby for the PFC (0.76) and our findings also support the validity of the 19-item ESDM 3-6.

Limitations

One important limitation is the absence of a structured diagnostic measure. At the beginning of the field survey, the PAPA [11] was not available. Furthermore, informants in the PAPA are parents and we were interested in getting information from the children themselves. The evidence suggests that children are better reporters of their own mental states. We believe that this assertion is also valid for preschool children, who are capable of providing relevant reports of some, but not all, depressive symptoms [41]. For this reason, we have completed the diagnosis from the parents' and teachers' answers to the ECI-IV.

The urban sample has another limitation. It was from a small city and we do not know the prevalence in big Spanish cities such as Madrid, Seville or Barcelona.

Clinical implications

Adult psychiatrists are becoming more and more interested in the early onset of psychiatric disorders and in the developmental course of depressive disorders. However, the first longitudinal studies did not include such young children since at that time most researchers were not interested in depression before the age of 6 and, in fact, did not believe in its existence. Until now, no longitudinal studies of early depression have been made. Data from the past decade of research show that depression is one of the later developing disorders of childhood and adolescence [3]. In the Oregon Adolescent Depression Project, the mean onset age of MDDs for cases that occurred before the age of 18 was found to be 14.7 years for girls and 15.4 for boys [30]. In a 7-year follow-up study of adolescent depression in Spain, 30% of the subjects (25% males and 33.34 females) with an MDD episode at the age of 18 had already been diagnosed with MDD between the ages of 12 and 14 [2]. But what happens to children with a preschool diagnosis of a depressive disorder? Longitudinal prospective studies that monitor these subjects from the age of 2 or 3 into adulthood are required if these questions are to be answered.

The present study is a contribution to the knowledge on the prevalence of depression before the age of 6 and the ESDM 3-6 is a brief and useful screening tool for identifying preschoolers at high risk of depression in the community. The majority of depressive preschoolers are not referred for a mental health evaluation and do not receive treatment. The detection and treatment of depressive symptoms and disorders in preschool years may prevent continuity and the relapses that are so common in mood disorders. We believe that it should be possible to take care of depressed preschoolers and their mothers and to stop the progression of a depressive disorder and its functional impairment in later years.

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Appendix: Scale of preschool depression for teachers (ESDM 3-6) (Domènech-Llaberia 1996)

No.	During recent weeks this child has	Almost always	Sometimes	Almost never
1	Had a sad expression			
2	Grumbled			
3	Talked and been friendly with his/her school fellows			
4	Done his/her school tasks well			
5	Laughed or smiled			
6	Seemed tired			
7	Cried			
8	Said that his/her legs, stomach and/or head ached			
9	Been happy			
10	Liked coming to school			
11	Referred to death (verbally or in pictures)			
12	Been bored			
13	Liked active games and sport			
14	Looked pale			
15	Played with his/her school fellows			
16	Been slow in whatever she/he did (routines and tasks)			
17	Seemed in bad mood			
18	Joined in class activities			
19	Liked going outside to play			

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